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31. Как в павильоне был снят выход в открытый космос, или разгадка "Джемини-4". Часть 1.

15-19 minutes

Dear friends! Only 2.5 months have passed since the moment when Alexei Leonov (USSR, Voskhod-2 spacecraft, March 1965) for the first time in the world entered open space, as the Americans repeated the same exit - it was Edward White (USA , ship "Gemini-4", June 1965). Having carefully watched the video with Edward White in the title role, I realized that this was not a spacewalk, but a short film filmed in the pavilion by Hollywood specialists (the video lasts 8 minutes 55 seconds - link below). From the point of view of the cameraman, I "decomposed" this video into cinematographic techniques, as a result of which a whole article was born with a continuation - how it was filmed. Several parts have already been written. Hope you find it interesting!

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Foreword.

The impetus for writing my "research" was an article by A. Popov, Doctor of Physics and Mathematics, about the Gemini-4 spacecraft. The article was titled "The first spacewalk of an American astronaut - a fake movie!" Considering the video clip about the American White's spacewalk, A. Popov draws attention to details that speak of falsification of filming - for example, an unmotivated fluttering tape around the spacesuit (due to the air flow) and incorrect (loop-like) movement of clouds at the end of the video ... The author of the article comes to the conclusion that before us is a fake, and the astronaut himself just hangs.

However, the readers were left with a question: how does an actor, suspended on a cable, perform such incredible somersaults in space, with turns in different planes, so characteristic of weightlessness.

As a film specialist who has been working in this industry for over 35 years, it is not difficult for me to answer these questions. In my research, I will show those simple cinematic techniques that allowed creating the illusion of weightlessness on the screen. Those who work in cinema or are simply interested in making films on space themes are well aware of these tricks used to obtain the effect of weightlessness. They are described in detail in special magazines (for example, "American Cinematographer"), in various books (for example, "Technique of Combined Shooting") - Fig. 1 - and, of course, in numerous Internet articles (for example,https://www.mirf.ru/kino/kak-izobrazhayut-nevesomost-v-kino/).

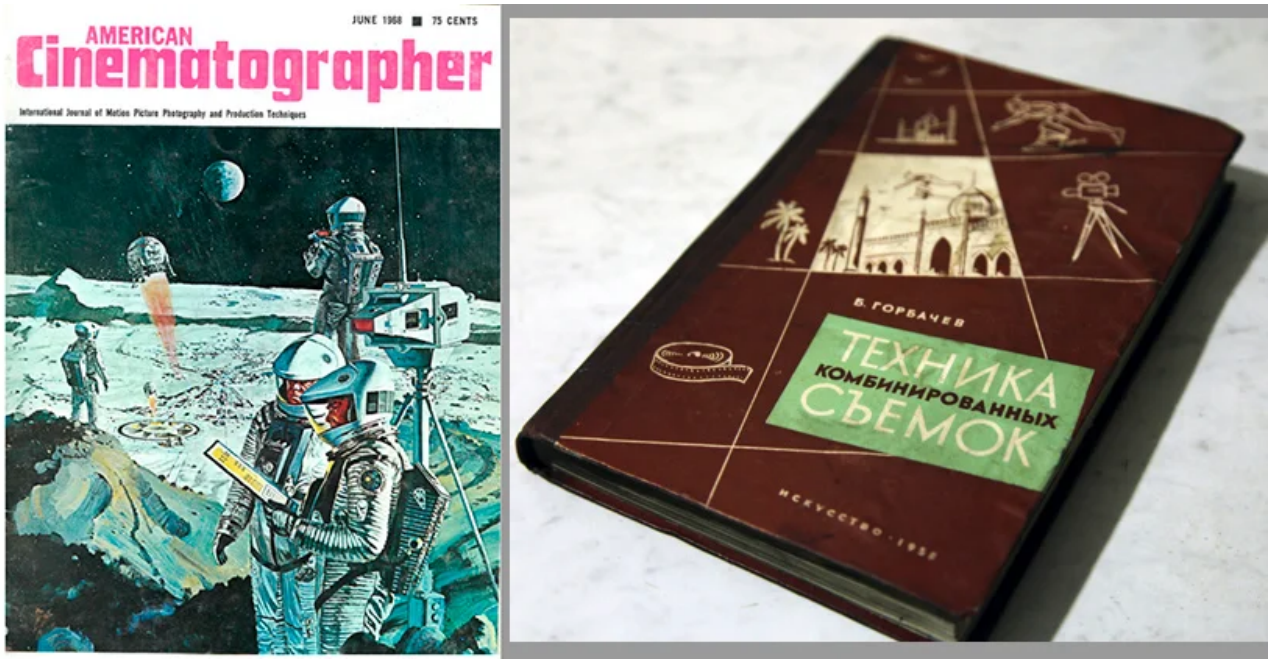

Fig. 1. Magazine and book

To understand how White's spacewalk was filmed in the pavilion, it is necessary to mention three cinematographic techniques that existed in the pre-computer era and are still used today. I apologize to advanced readers that I will reiterate well-known facts and cite sometimes "hackneyed" movie quotes from famous films. After all, it is quite possible that some of the readers did not watch these films or simply does not know how these or those unusual shots were filmed in feature (fiction) films. For example, in some shots in the films "Space Flight" (Mosfilm, 1935), "Road to the Stars" (Lennauchfilm, 1957) and "Destination - Moon" (USA, 1950), weightlessness was filmed in this way: the actor was suspended on a rope, but due to the bottom point of the shot (the camera was directed vertically upwards), the cable was blocked by the actor's back.

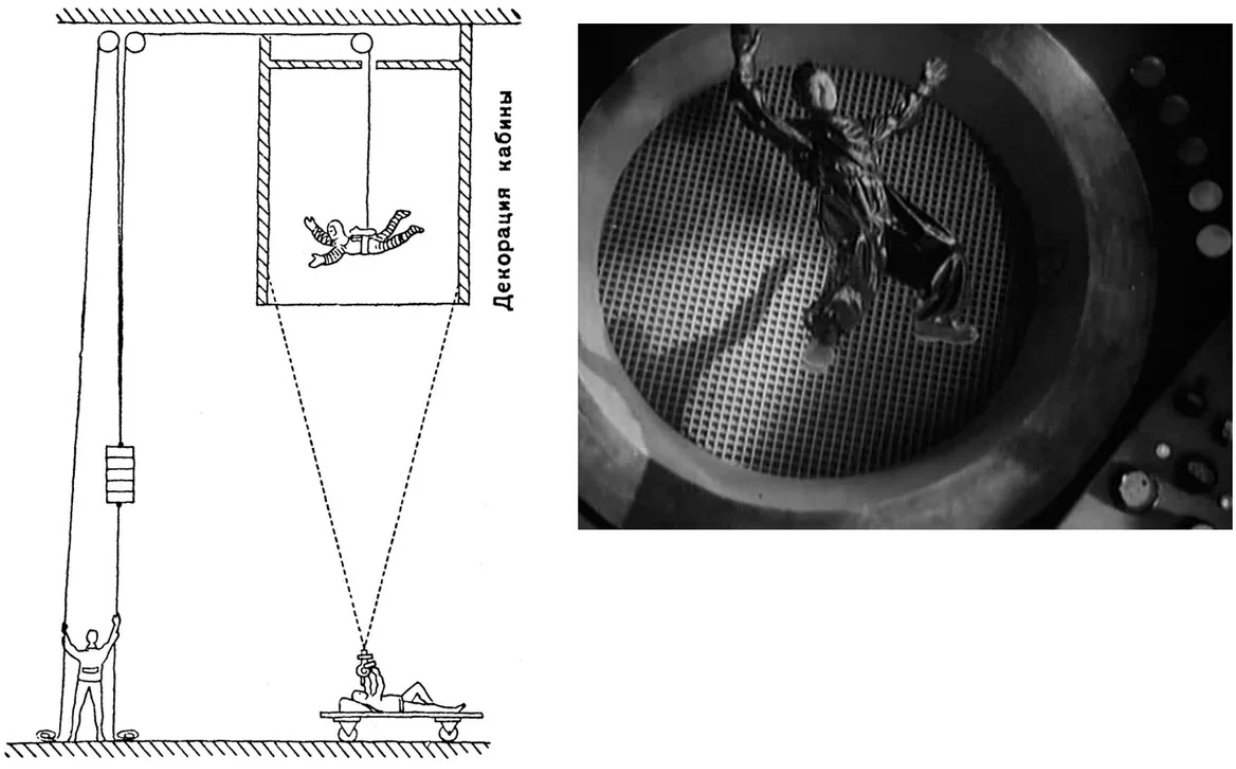

Fig. 2. Zero gravity filming scheme and still from the movie "Space Flight".

Similar techniques were used by the masters of Hollywood to create weightlessness in the Gemini IV footage. In our opinion, exposure of the Gemini scam is very important. As A. Popov wrote, *"... It is on the foundation of the Gemini that the" building of flights to the moon "was erected. To show that this foundation is false would be a serious blow to the lunar scam. ... For the fiftieth anniversary of the Gemini project, the famous American website Atlantic wrote:* ***"NASA has started the Gemini project to prepare the upcoming Apollo program. Hundreds of targets have been achieved, including the first American spacewalk.*** *After the end of the project, many Gemini astronauts flew to the Moon in Apollo. "*
The most popularized in the space scam (before the lunar Apolloniad) is Gemini 4. According to NASA, on June 3 - 7, 1965, this spacecraft flew (crew - E. White and D. McDivitt), and it was during this expedition that astronaut E. White made a spacewalk.

How the spacewalk was shown.

According to NASA legend, the Americans went into outer space two and a half months after the first such exit in the world was carried out by the Soviet Union. Alexey Leonov, a citizen of the USSR, went into open space on March 18, 1965 from the Voskhod-2 spacecraft. And already on June 3, 1965, Edward White allegedly made a spacewalk from the Gemini 4 spacecraft - Fig. 3.

Fig. 3. This is how White's exit was portrayed by the artist.

We write "allegedly" because we have strong evidence that the Americans did not carry out any spacewalk, and the provided 9-minute space walk was filmed in the pavilion by the masters of Hollywood. Initially, the film was shot at 6 frames per second, and for demonstration at a standard speed of 24 fps, each frame is repeated 4 times. Therefore, the whole image looks like jerky quick freeze frames.

A modernized version of White's spacewalk (processed on a computer with the use of modern programs) is posted on Yu-Tuba. 6 frames per second were turned into 24 frames not by mechanical reproduction, but by

interpolation (completion) of intermediate frames. In addition, the image was stabilized - frame twitching was removed.

White's spacewalk video

The video itself is great. And it is very similar to documentary filming. White first stands at the open door of the spacecraft, then, held by the halyard, slowly flies off five meters. At the same time, it spins in different directions, then hiding outside the frame, then appearing again - Fig. 4.

Fig. 4. Some fragments of the video.

It would seem that it was filmed convincingly and is very similar to real weightlessness. However, 3 minutes after the start of the video, an event suddenly occurs, which immediately casts doubt on the documentary nature of what is happening. A glove flies out of the open door of the spacecraft after White exited - fig. 5.

Fig. 5. A glove flies out of the open hatch.

It soars freely in space, slides off the door, moves up, hits the halyard, turns over, flies off to the side and disappears outside the frame. According to the masters of Hollywood, this fact should convince the viewer that the shooting takes place in zero gravity.
No matter how you look closely at the glove, you cannot see the contours around it, which could remain from the countermask if the object was imprinted into the frame using a chroma key.
In the pre-computer era, the use of a chroma key is easy to identify by the contours around the object introduced into the background - Fig. 6.

Fig. 6. A scene from the film “The Baghdad Thief (Great Britain, 1940), where (perhaps for the first time) a chromakey (blue screen) was used for combined filming.

To separate the chroma key (blue or green background), two contrasting black-and-white films are used, with their help a mask and a counter mask are made - Fig. 7.

Fig. 7. An example of a mask and counter mask on black and white film.

One film covers the background when a foreground object is imprinted, and the second film covers the object itself, thereby allowing access to the background. In two exposures, a separate background and a separate foreground image are alternately imprinted on the new film. Because of these masks (take a closer look, their edges "float") outlines are formed around objects, which give out the use of combined shots.

From this point of view, it can be argued that in the video about Gemini 4, the glove is real and really is in the frame at the same time as the astronaut, colliding on its way with either the door or the astronaut's halyard. But it is this floating glove that holds the key to Gemini. The glove reveals the way of shooting.

But whose glove is this, and who dropped it? Second Astronaut D. McDivitt? Although the Gemini capsule is very small in size, it could hold two astronauts - Fig. 8.

Fig. 8. E. White and D. McDivitt at the Gemini capsule mockup.

Based on the design of the capsule, it can only be on the left. And the glove flies out of the inner compartment from somewhere to the left and hits the porthole of the door. But why did he drop the glove? And what was he left with? Indeed, when the doors of the capsule are opened, complete depressurization occurs inside.
Let's not focus on this, maybe they have a bunch of spare gloves in the capsule there! This glove told us about another, more important fact - that the technique of combined shooting was used here. Pulling this thread, we discovered a whole tangle of manipulations and inconsistencies, both in the movements of the astronaut and in the effect of weightlessness, which convinced us that the "spacewalk" was filmed in the pavilion against the background of a movie screen.

It was against the background of the movie screen that the flight of Gemini in the Earth's orbit was filmed in the feature film The Man on the Moon (First Man, 2018). The film is dedicated to the pioneer Armstrong, who allegedly flew Gemini 8 before the Apollo 11 mission. In general, many of the astronauts from the Gemini project later became lunonauts. It should be added that in total in the Gemini mission, according to NASA legend, there were 10 flights in a year and a half.

So, the flight of "Gemini" over the earth's surface was filmed in the film "Man on the Moon" using a mock-up of a capsule, which was projected onto a movie screen with moving clouds. More precisely, it was not just a cinema screen, but a modern LED panel. The capsule could rotate around the longitudinal axis, depicting the torsion of the spacecraft. And, in addition, the platform on which the capsule was attached, with the help of hydraulic pistons-supports, could swing in a horizontal plane.
This is what it looked like - fig. 9.

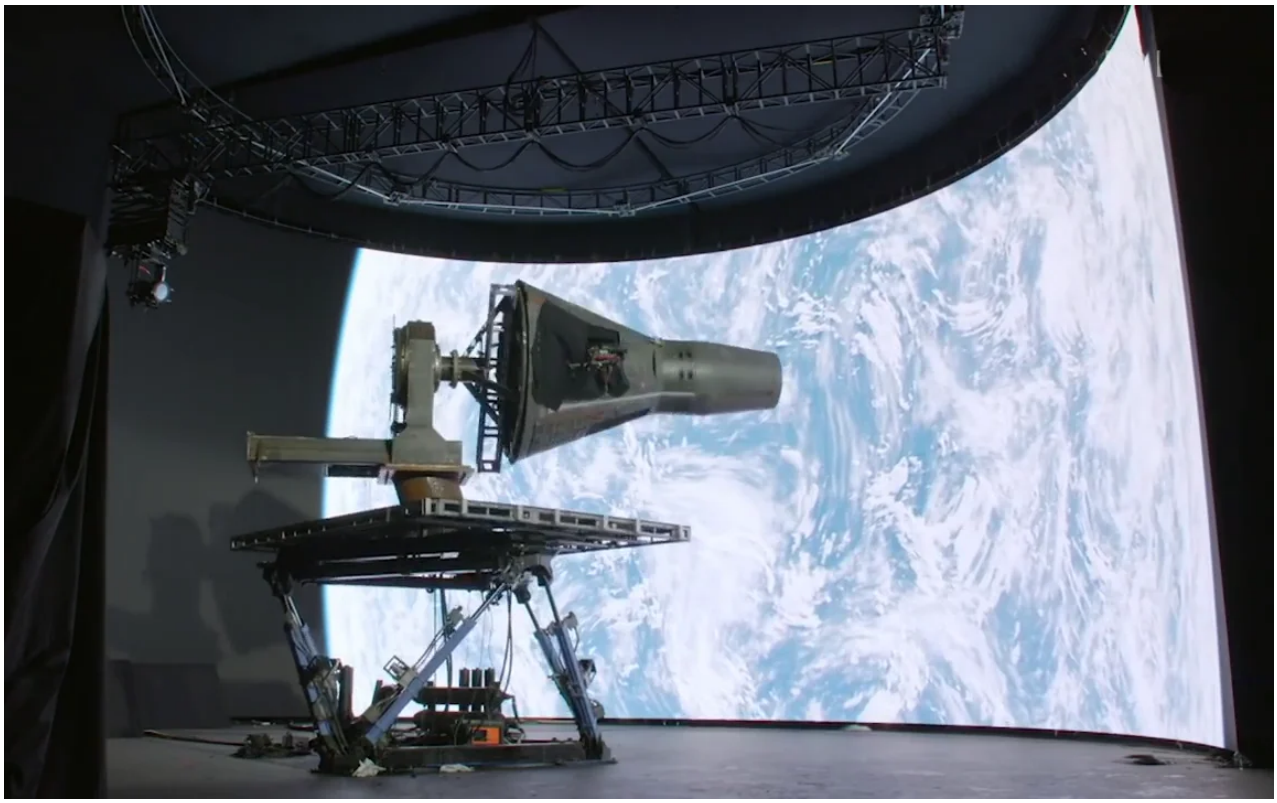

Fig. 9. Shooting of the model "Gemini" against the background of clouds for the film "The Man on the Moon".

GIF file.

In general terms, White's spacewalk was filmed in about the same way. A filming camera was mounted on a mock-up of a spacecraft, the movement of clouds was projected onto a movie screen, and the astronaut himself was suspended on two thin steel cables, similar to piano strings. For example, it was the piano strings that were used to hang actors when shooting scenes of weightlessness in the Hollywood film "Destination Moon", USA, 1950. The film won an Oscar in 1951 for special effects.
During the filming of the movie "Destination - Moon"*... A separate difficulty arose with space suits. At first, the director wanted to borrow ammunition from the pilots. Such attire looked very advantageous and authentic, but it turned out that the fabric of such costumes was delicate and easily torn from contact with the piano strings, on which the actors were hung to simulate weightlessness. The artist had to create a spacesuit design from scratch ... In heavy, closed spacesuits, it was difficult for the actors to move, and they quickly suffocated and tired. (*https://ru.wikipedia.org/wiki/Destination_—_Moon)

Perhaps you will be skeptical about the conclusion that astronaut White in the video under discussion is simply suspended on two ropes (with one rope, the actor will spin around an axis). A person unfamiliar with the technology of combined filming does not understand how an actor portraying White can spin in different planes and perform difficult somersaults. Wait a bit, we will reveal these movie secrets for you. You will be surprised when you find out that the actor, suspended on a cable, did not perform any somersaults and turns at all, but simply hung motionless, sometimes slightly moving his arms and legs. And the camera made the turns instead of him - it moved around the astronaut.
But before we reveal in detail the technology, how the effect of weightlessness was created in the pavilion, let me tell you about four reasons that led us to the conclusion that White's spacewalk was a falsification. The first two reasons have been mentioned repeatedly before us, so we will limit ourselves to only a cursory description. But the third and fourth reasons relate directly to the field of cinema, and therefore will be considered in detail by us.

1st reason - depressurization.

There is a fundamental difference in the way Soviet cosmonauts entered outer space and the way American astronauts portrayed it in the 60s. The Americans went directly into outer space (opened the door and went out), and in the USSR a transition airlock was invented. With this method of exiting the spacecraft,

depressurization does not occur inside, and all instruments continue to operate in the air atmosphere. For example, a flexible inflatable airlock "Volga" was used to exit Alexei Leonov - Fig. 10-12.

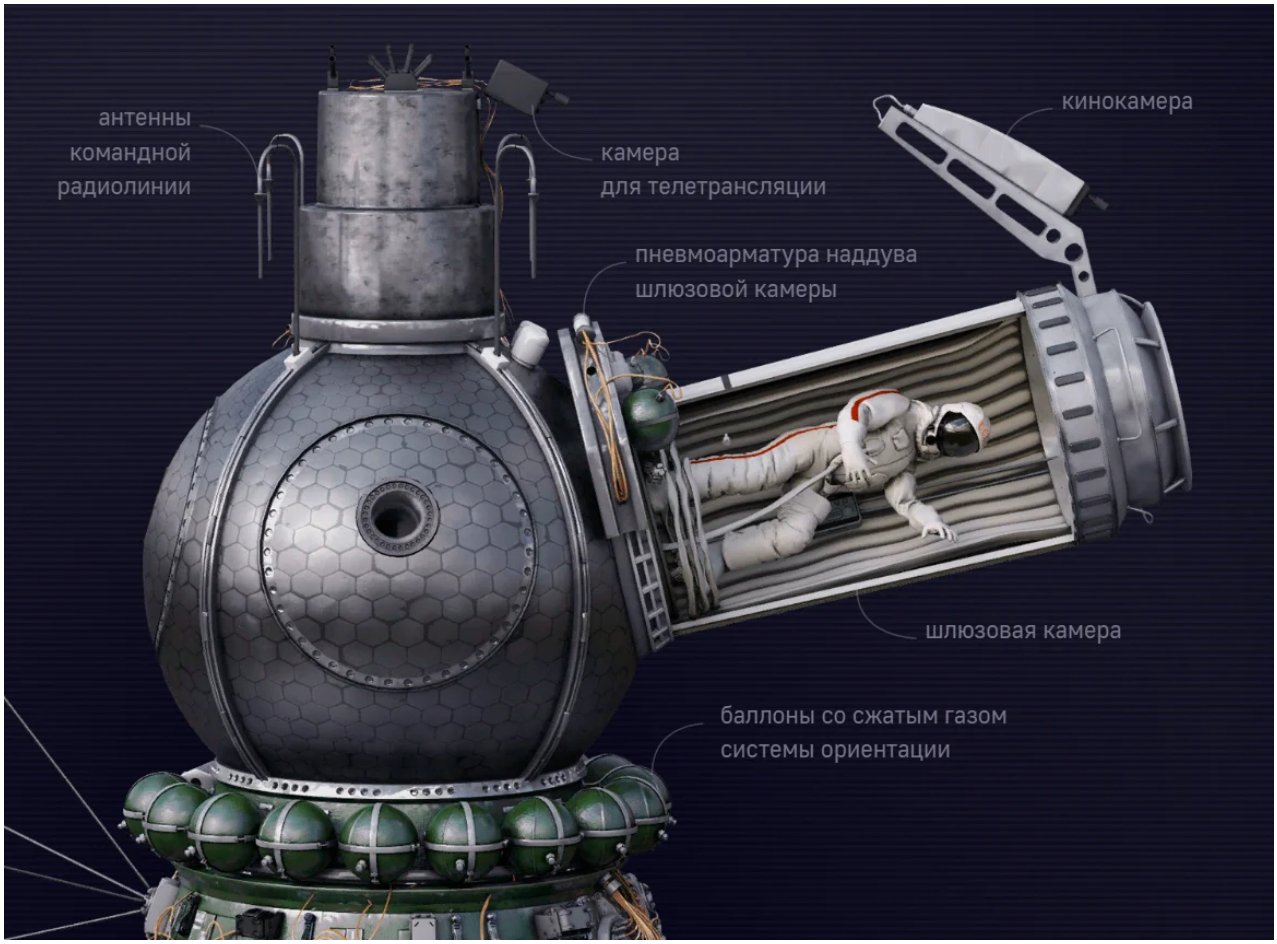

Fig. 10. Air lock for spacewalk.

The picture is taken from the project "Leonov, your way out! "

Fig. 11. Alexey Leonov and his picture of a spacewalk.

Fig. 12. Gateway at the Museum of Cosmonautics in Moscow.

Cameras of the Topaz-25 television system were installed on the outer surface of the ship. Filming directly from the ship was also carried out using a special 16-mm C-97 film camera in a screen-vacuum shell. A documentary film "Above the Planet in a Spacesuit" was released about Alexei Leonov's exit in 1965.

Currently, the ISS is only entered into open space through an airlock, there is no depressurization inside the ISS.

The Americans made their first spacewalk from the Gemini 4 spacecraft, according to the NASA legend. Initially, the spacewalk was not planned. But since such an exit was carried out in the Soviet Union, the United States had to "catch up" with the USSR, however, this time by means of Hollywood. And in order not just to catch up, but to overtake the USSR, they reported that the stay in open space was 20 minutes, while A. Leonov was in open space for 9 minutes and 12 seconds.

In the 60s of the twentieth century, the Americans had not yet developed an airlock, so the Gemini 4 astronauts simply opened the doors of the spacecraft and Edward White went outside and made the so-called "space walk" - spacewalk.

2nd reason - hatch.

The forums hotly debate in which direction the Gemini 4 hatch opened.

On submarines, the hatches open outward so that when submerged, the water pressure presses the hatch against the opening - fig. 13.

Fig. 13. The hatch opens outward.

If the hatches were opened inward, then, due to the high pressure from outside, the water would tend to open the hatch and seep through the cracks.
In a spacecraft, the pressure comes from the inside, so the hatches in the descent vehicle open inward - Fig. 14. Internal pressure pushes the hatch against the opening.

Fig. 14. The hatch of the descent vehicle opens inward.

In addition, the hatches are made round in order to ensure uniform pressure.
Now let's look at the hatches of the Gemini-4 spacecraft - they are rectangular, or rather trapezoidal, and open outward. The contact line has a complex relief shape - Fig. 15.

Fig. 15. The intricate relief line of the Gemini hatch hole.

In addition, the area of such a hatch is under great pressure from the inside. Here in "Apollo-7", which (as many believe) actually went into space in a circular orbit around the Earth, the hatch area is much smaller.

Luke "Apollo 7".

We will not discuss here the features of the engineering solution of the hatches and how (with a window "L" - shaped handle or a steering wheel) they open. We just outlined a topic that comes up from time to time on the forums when discussing Gemini flights. Let's leave these questions out of brackets, let engineers and designers deal with them.

My task is different - from the point of view of my profession, a cameraman, to tell about those cinematic techniques that were used to create the illusion of weightlessness in the pavilion, and, as far as possible, repeat some fragments of the flight on models.

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Continuation, part 2.

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Cameraman L. Konovalov was with you. Until next time!